

Q.P. Code:00005523

[Time:3.00 Hrs]

[Marks:100]

Please check whether you have got the right question paper.

- N.B:
1. All questions are compulsory.
 2. Figures to the right indicate full marks.
 3. Use of non-programmable simple calculator is allowed.
 4. Graph paper will be provided on demand of student.

Q.1 Attempt any **Four** of the following:

- A) Find the total profit function when $x = 10$, if the cost function $C = 40 + 15x - x^2$, x is number of items produced and the demand function is $p = 200 - x^2$. 5
- B) The demand function is given by $P = 50 + 6D + 4D^2$. Find the total revenue, average revenue and the marginal revenue when the demand is 5 units. 5
- C) Differentiate the following with respect to x . 5
 i) $y = \frac{x+2}{x-5}$ ii) $y = 5x^4 - 3e^x + 4\sqrt{x} + 2x$.
- D) The demand function is given by $D = \frac{10}{P-1}$, find the elasticity of demand when the price is 5. 5
- E) Examine the following function for maxima and minima, 5

$$f(x) = 2x^3 - 9x^2 + 12x + 5$$

Q.2 Attempt any **Four** of the following:

- A) Mr. Pankaj Kansra lent Rs. 2560 to Mr. Abhishek and Rs. 3650 to Mr. Ashwin at 6% rate of interest. After how many years should he receive a total interest of Rs. 3726? 5
- B) Compute the compound amount and compound interest of Rs.25000 If invested at 9% for 2 years and the interest compounded semi-annually. 5
- C) Mr. Ravi invested Rs. 5000 in an annuity with quarterly payments for a period of 2 years at 5% the rate of interest of 10%. Find the accumulated value of the annuity at the end of 2nd year. 5
- D) Find the present value of Rs.10,000 payable 3 years hence, if the interest is compounded annually at 10% p.a. 5
- E) Mr. Patel took a loan of Rs.80,000 with 12% p.a. to be repaid in 4 months. Calculate EMI using reducing balance method. 5

Q.3 Attempt any **Four** of the following:

A) Write the properties of line of regression. 5

B) Find Rank correlation coefficient for the following data: 5

X	35	49	52	98	75	66
Y	85	93	77	120	100	98

C) For the following data calculate Karl Pearson's coefficient of correlation. 5

x	2	3	1	5	6	4
y	1	0	4	2	5	3

D) Given the following values 5

$$\bar{x} = 10, \quad \bar{y} = 90, \quad \sigma_x = 3, \quad \sigma_y = 12$$

Correlation coefficient between x and y 0.8 find two regression equation.

E) Given the two regression equations as 5

$$3x - 2y - 10 = 0 \text{ and } 24x - 25y + 145 = 0$$

Find i) Coefficient of correlation, ii) Mean value of x and y.

Q.4 Attempt any **Four** of the following:

A) Explain types of index numbers in details. 5

B) Find trend by five-yearly moving averages for the following data: 5

Years	2001	2002	2003	2004	2005	2006	2007
No. of workers	230	270	250	360	380	390	410

C) The following table gives the revenue of Nishana Ltd. For 5 consecutive years. Find the equation of the trend by using the method of least squares. (Trend values for each year is not expected) 5

Year	2003	2004	2005	2006	2007
Revenue (Cr. Rs.)	21	24	23	28	26

D) From the following data calculate Fisher index numbers.

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Commodities	Base year		Current year	
	Price	Quantity	Price	Quantity
A	4	12	6	16
B	2	16	3	20
C	8	9	11	14

E) Find the cost-of-living Index number for the following data by family budget method.

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Groups	Index Number	Weights
Food	120	60
Clothing	180	5
Fuel	250	10
Rent	350	15
Miscellaneous	100	10

Q.5 Attempt any **Four** of the following:

A) Write the Characteristics of Binomial Distributions.

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B) The mean of a binomial distribution is 3 and the variance is 1.2, find n and p .

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C) Out of the total passengers travelling by BEST buses 40% do not have the exact money for their tickets. If a conductor gives tickets to 15 passengers, find the probability that less than 1 passengers will pay exact money.

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D) For a normal distribution mean is 50 and standard deviation is 15. Find (i) Median (ii) Mode (iii) the limit of middle 50% of the observations (iv) Mean deviation.

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E) A STD booth owner has an average balance of Rs. 230 and standard deviation of Rs. 10. Assuming that the balance with the owner behave normally, find the proportion of the balance being (i) less than Rs. 195 and (ii) between Rs. 210 and Rs. 250. [Area under normal curve between $Z = 0$ and $Z = 2$ is 0.4772 and Area between $Z = 0$ and $Z = 1.5$ is 0.4332]

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